REMARKS

The following comments address all stated grounds for rejection, and we believe place the presently pending claims, as identified above, in condition for allowance. Upon entry of this paper, claim 3 has been amended, no claims have been canceled, and no claims have been added as new claims, thus claims 1-33 are presently pending in this application. No new matter has been added.

The present invention addresses the limitations of conventional CAD (Computer Aided Design) systems by integrating analyses into the models of products. In particular, the present invention captures an analysis inside the feature mechanism to generate reproducible referenceable parameters and/or geometric entities that describe the results of the analysis. In one embodiment of the present invention, an analysis is represented as a feature that is part of a model of a product. Because the analysis is integrated into the feature-based model, when a change in the model that requires updating of the analysis occurs, the analysis is automatically updated and the associated feature is updated. In this embodiment of the present invention, a new type of feature is defined to represent an analysis, such as an engineering analysis. This feature serves as a placeholder for such analysis.

Objections

Objection to claim 3

Claim 3 was noted by the Examiner to be lacking a period. The claim has been amended to add a period at the end of the claim.

Objection To References Cited in IDS

The examiner has indicated (see paragraphs 1-6 of Office Action) that the cited references A6 and A7 are unacceptable for failure to comply with the provisions of Sections 1.56, 1.97 and 1.98. Reference A6 was found to be objectionable due to the lack of a date of publication. Reference A7 was found to be objectionable due to the lack of a title page and confusion over whether all 640 pages were considered relevant or whether only the submitted pages 1-121 were considered relevant. Applicants have submitted an additional supplemental IDS supplying the additional information requested by the Examiner.

The Examiner has also requested copies of software packages of Pro/Engineer and Pro/Intralink from Parametric Technology Corporation, the current assignee, based on a mistaken assumption that Applicant was attempting to incorporate Pro/Engineer by reference. Additionally the Examiner has requested copies of the source code for Pro/Engineer. Applicant respectfully traverses these requests since, as more fully set forth below, they are based on the incorrect belief that Applicant attempted to incorporate Pro/Engineer by reference. Applicant also notes that Pro/Engineer is a commercial product and providing the source code for the commercial product would be an open invitation to software piracy from the unscrupulous as the code would become part of the file wrapper and open to inspection by the public.

Objection's to Drawing Informalities

Several informalities in the drawings were noted. Formal drawings have been prepared and are submitted herewith.

Rejections

Rejection of claims 1-33 based on §112, First Paragraph (Lack of Enablement)

The Examiner rejects claims 1-33 as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it

pertains...to make and/or use the invention. The Examiner states an incorrect belief that Applicant has incorrectly attempted to incorporate the software application Pro/Engineer 2000i by referring to that software application in lines 11-13 of the specification. However the reference to Pro/Engineer 2000i is not an attempt to incorporate the software application by reference, but rather an attempt to note the software application as a typical CAD/CAM package. If the Applicant had intended to incorporate the software package by reference, the phrase "incorporate by reference" or a variation thereof would have been used (putting aside the issue as moot as to whether or not a software package may be incorporated by reference).

The Examiner continues on to state, perhaps due to the incorrect assumption that Applicant was relying on an incorporation by reference that was faulty for support, that the specification is not enabling for the features listed in paragraph 14 of the Office Action. The Examiner further states that the features listed in paragraph 14 are referred to in the specification but not sufficiently described so as to enable one skilled in the art to make or use the invention without undue experimentation.

The analysis required to determine whether the enablement requirement has been met focuses on whether the features are described in the specification so as to enable **one skilled in the art** ... to make or use the invention, without undue experimentation. It is respectfully suggested that each of the features questioned by the Examiner would be understood by one skilled in the art. The Examiner found that the following features lacked support in the specification:

-providing a feature-based model of an object;
-providing an analysis;
-creating at least one feature in the model that contains the analysis;
-adding the feature to the model in the object;
-the analysis is an engineering analysis;
-the analysis is provided by a program other than a CAD system;
-a user of the CAD system defines and provides the analysis;

-modifying the model when the analysis is performed again;

-automatically updating the analysis feature-based on new results;

-the analysis feature creates output and wherein at least some of the output of the analysis is changed in the automatic updating.

Contrary to the assertions of the Examiner, each of the features is described sufficiently in the specification to enable one skilled in the art to make or use the invention. The feature "providing a feature-based model of an object" is first discussed in the Background of the Invention (e.g. page 1, lines 15-18) precisely because it is well understood by those skilled in the art. The present invention focuses on integrating an analysis into a feature-based model, but the underlying creation of a feature-based model per se is well understood in the art. The feature "providing an analysis" similarly is first discussed in the Background of the Invention (e.g. page 1, lines 29-36), before being discussed throughout the Detailed Description section. The present invention focuses on integrating an analysis into a feature-based model, but the underlying process of analyzing data per se is well understood in the art. The feature "creating at least one feature in the model that contains the analysis" is described in a sufficient level of detail to enable **one skilled in the art**... to make or use the invention throughout the Detailed Description (e.g. page 4, lines 13-22, pages 6, lines 32-36, page 7, line 1-35 etc.). Similarly, the features "adding the feature to the model in the object" (e.g. page 7 line 3-8), "the analysis is an engineering analysis(e.g. page 1, line 29-30, in the Background); "the analysis is provided by a program other than a CAD system" (e.g. page 4, lines 28-32); "a user of the CAD system defines and provides the analysis" (e.g. page 6, lines 13-16); "modifying the model when the analysis is performed again" (e.g. page 7, lines 9-27); "automatically updating the analysis feature-based on new results" (e.g. page 7, lines 24-27) and "the analysis feature creates output and wherein at least some of the output of the analysis is changed in the automatic updating"(e.g. page 7, lines 9-27) all include sufficient description to enable **one skilled in the art**... to make or use the invention. CAD/CAM technology is well developed, and the focus of the application is on the novel aspects of the invention rather than upon the underlying technology well understood by practitioners in the field. The features of the invention

which are novel claimed elements are sufficiently described when considered in combination with the knowledge of the skilled practitioner.

Rejection of claims 1-33 based on §112, First Paragraph (Inventor Not in Possession of Invention at Time of Application)

The examiner also issued a §112 paragraph 1 rejection based on the Examiner's belief that the invention was not sufficiently described in the specification as to reasonably convey to one skilled in the art that the inventor at the time the application was filed, had possession of the claimed invention. The Examiner cites the same features listed above in the enablement rejection. The Examiner seems to be basing the rejection on the belief that the Applicant had attempted to incorrectly incorporate by reference Pro/Engineer. The Examiner also thoughtfully includes several pages of case law and argument directed to the doctrine of incorporation by reference. However, as previously noted above, Applicant did not attempt to incorporate Pro/Engineer by reference but rather referred to it as an example of a feature-based CAD/CAM application.

Applicant respectfully traverses the suggestion that the specification does not sufficiently describe the invention to enable **one skilled in the art** to determine that Applicant had possession of the invention at the time it was filed. As noted above during the enablement discussion, the specification describes in detail the integration of an analysis as a feature into a feature-based CAD/CAM system. The creation of the analysis feature and the use of the integrated analysis feature is described in the Detailed Description. Examples of the use of the integrated analysis feature are also included(see pages 7 and 8). Given the level of description of the present invention describing the process of integrating an analysis into a feature-based CAD/CAM system, and the fact that (as the Examiner pointed out) the current assignee is the creator of a software package listed as a representative example of a feature-based CAD/CAM system, the suggestion that the Applicant is not in possession of the invention at the time of filing does not withstand close scrutiny.

Rejection of claims 1-33 based on §112, Second Paragraph (Claims Indefinite)

The Examiner indicated that claims 7 and 18 are rejected for being indefinite for failing to point out what was included or excluded by " a program other than a CAD system". The applicant respectfully traverses the rejection. Claim 7 reads "The method of Claim 1 wherein the analysis is provided by a program other than the CAD system." and is dependent upon Claim 1 and includes the limitations thereof. Claim 7 refers therefore to the situation where the actual analysis is performed by an external application, a non-CAD system application, prior to incorporating the analysis into a feature in the CAD system. The limitation is adequately supported in the specification which makes clear the analysis may be performed by an external application not part of the CAD system. The claimed elements are quite clear when read in conjunction with the dependent claims and the supporting specification. Similarly, the rejected claim 18 is a system claim reading "The system of Claim 16 wherein the analysis is provided and applied by a program other than the CAD package." Claim 16 is in turn dependent upon independent claim 14. Claim 14 describes a parametric feature-based system, Claim 16 adds the additional limitation that the model is provided by a CAD package. Claim 18 indicates that the actual analysis is performed by an external application, a non-CAD system application, prior to incorporating the analysis into a feature in the feature-based system. Again, the limitation is adequately supported in the specification which makes clear the analysis may be performed by an external application not part of the CAD system. The claimed elements are clearly identified when read in conjunction with the dependent claims and the supporting specification.

Provisional Obviousness-Type Double Patenting Rejection
of Claims 1, 7, 14, 18-19, 23, 27, 30-32 Based on Co-Pending Application

The Examiner indicated that claims 1, 7, 14, 18-19, 23, 27, and 30-32 were not patentably distinct from claims 1, 8, and 24 of co-pending application 09/318,105 (submitted by the current Assignee) as all of the claims are directed to using an external application to import an analysis to a feature-based CAD system. The Applicant respectfully traverses the rejection.

The Examiner stated that he was interpreting all of the claims to be a parametric feature-based model in a CAD system which uses external programs to carry out supplemental analysis which are then integrated into the CAD design. The assumption is faulty is several respects. Not all of the claims 1-33 require the system to be a parametric feature-based system. Of the independent claims, only claims 14 and 19 have the parametric limitation. The limitation that the analysis is performed in an external application is included in dependent claim 7, dependent claim 18 and arguably independent claim 32. Also, none of the claims in co-pending application 09/318,105 include integrating the analysis as a separate feature in a feature-based CAD system. Accordingly, the claims in co-pending application 09/318,105 are patentably distinct from the claims of the pending application.

Rejection of claims 1-33 U.S.C. §102(b)

The Examiner rejects claims 1-33 pursuant to 35. U.S.C. 102(b) as being anticipated by Sebastian (U.S. Patent No. 5,552, 995), Johnson (U.S. Patent No. 5, 323, 333), Rabemanantsoa or Kaylan-Seshu et al. The Applicants respectfully traverse each of these rejections for the reasons stated below.

Sebastian describes a CAD system which attempts to concurrently design parts, tools for making a part and the processes used to make the part. Parts are made from a number of sub-parts and a product is designed from a combination of parts. A material selector module is used to determine a list of material properties and associated threshold values that are critical for success in the design of the product. The core design module takes into account functional specifications as well as part geometry. Pro/Engineer is

used in one of the disclosed embodiments. Sebastian does not teach the integration of an analysis as a feature into a feature-based CAD system.

The present invention discloses a method, system and a medium for integrating an analysis into a feature-based CAD system. Sebastian does not. The only similarity between the present application and the cited reference seems to be that both may use Pro/Engineer as a base underlying system. Sebastian however focuses on the design process from the standpoint of concurrently designing the part, tool and processes to make the part while the present invention discloses integrating an analysis as a feature in a feature-based system with the aim of using the integrated an analysis in the design process. Sebastian does not disclose the limitations of "creating at least one feature in the model that contains the analysis" and "adding the feature to the model of the object" as in independent claim 1. Sebastian also does not disclose the limitations of "creating an analysis feature based on the analysis and the results", "modifying the model so that when the analysis is performed again on the model new results are yielded" and "automatically updating the analysis feature based on the new results" as in independent claim 9. Additionally, Sebastian does not disclose the limitations of "a feature generator for generating features for the feature-based model, including at least one feature that contains the analysis" as in independent claim 12. Sebastian does not disclose or claim the limitations of "providing an analysis that is applied to the parametric feature-based model to produce results", "applying the analysis to the parametric feature-based model to produce results", " based on the analysis and the results, determining whether the parametric feature-based model satisfies a requirement", and "based on this determination, performing an action" as in independent claim 14. Similarly, Sebastian does not teach or claim the limitations of "applying the analysis to the model multiple times to produce results, each time with different sets of values for the selected set of parameters" and "choosing at least one of the set of values for the selected sets of parameters based on the results from applying the analysis to the model multiple times" as in independent claim 19.

Sebastian does not teach or claim the limitations of "performing an analysis for acting on at least a portion of the model", "creating at least one selected feature based in the analysis of the model that contains the selected feature", and "adding the selected feature to the model of the object" as in independent claim 23. Additionally, Sebastian does not teach or claim the limitations of "creating an analysis feature based on the

analysis and the results", "modifying the model so that when the analysis is performed again on the model new results are yielded," and "automatically updating the analysis feature based on the new results" as in independent claim 27 of the present invention. Also, Sebastian does not teach or claim the limitations of "representing the results as one or more selected features in the model" and "creating at least one new feature that references at least one of the selected features" as in independent claim 30. Sebastion also does not teach or claim the limitations of "applying the analysis to the model multiple times to produce results, each time with a different set of values for the selected parameters", "choosing the values for the selected set of parameters for which the results from applying the analysis are optimal", and "creating at least one new feature that references the optimal results of the analysis" as in independent claim 31. Neither does Sebastian teach or claim the limitations of "creating a feature that references the analysis" as in independent claim 32.

The cited portions of Sebastian are simply not applicable to the present invention as they do not include the missing limitations. Since all of the independent claims in the present application (and the claims dependent thereon) include limitations that are neither taught nor claimed in Sebastian, Applicant requests the withdrawal of the 35 U.S.C. 102(b) rejection based on Sebastian.

Jonson discloses a method of allocating tolerances in manufacturing processes. A total tolerance is specified to be allocated among a plurality of variable tolerances each having an associated assembly feature. For each associated assembly feature, an associated first, second and third tolerance point is defined. The tolerance points relate to the points at which changes in stringency of the variable tolerance begin to change or stop changing the cost of achieving the variable tolerance. A CAD system is used to allocate the tolerances and Pro/Engineer is cited as a representative CAD system. An external results module is interfaced with the CAD system so as to display a graphical depiction of the results on a display. Jonson does not disclose the integration of an analysis as a feature in a feature-based model.

The limitations included in the independent claims of the present application that were discussed above and found lacking in the Sebastian reference are also absent from Jonsen. Jonsen neither teaches nor claims the integration of an analysis as a feature in a feature-based system. In fact, the cited figure (Figure 8) shows an **external** allocation results module being interfaced with a display module solely for the purpose of display.

There is no mention of the analysis being integrated into a feature. Since all of the independent claims in the present application (and the claims dependent thereon) include limitations that are neither taught nor claimed in Jonsen, Applicant requests the withdrawal of the 35 U.S.C. 102(b) rejection based on Jonsen.

Rabemanantsoa is an article discussing the coupling of Artificial Intelligence with an object-oriented database in a CAD/CAM environment. Pro/Engineer is used to model the products and parts being designed. An object-oriented database is used to model data and handle logic based reasoning of graph representation. A system is disclosed which integrates automated feature recognition plus position and orientation needed for part mating. The external database is used in planning and manufacturing assembly tasks. There is no discussion of the integration of an analysis as a feature in the feature-based system. The system relies on an artificial intelligence module external to the CAD/CAM system. The cited section 3.1 does not discuss the integration of performed analyses into the CAD/CAM system.

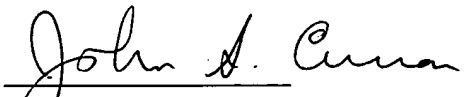
The limitations discussed above that appear in the present invention and are lacking in the Jonsen and Sebastian references are also lacking in Rabemanantsoa. Since all of the independent claims in the present application
(and the claims dependent thereon) include limitations that are not disclosed in Rabemanantsoa, Applicant requests the withdrawal of the 35 U.S.C. 102(b) rejection based on Rabemanantsoa.

Kalyun-Seshu et al is an article discussing environmental concerns as they relate to the product design cycle. A method of using assessment models with existing CAD packages is offered. The method involves outputting data from the CAD systems to **external** assessment tools(see pages 312 and 313). There is no discussion of integrating an analysis into the CAD system as a separate feature. As previously discussed, all of the independent claims of the present invention (and the claims dependent thereon) require the integration of an analysis into the CAD system design process. The Kalyun-Seshu et al reference does not disclose the limitations discussed above during the discussion of the previous three references. Instead, Kalyun-Seshu et al exports data to external assessment programs. Since all of the independent claims in the present application (and the claims dependent thereon) include limitations that are not disclosed in Kalyun-Seshu et al, Applicant requests the withdrawal of the 35 U.S.C. 102(b) rejection based on Kalyun-Seshu et al.

CONCLUSION

In view of the foregoing remarks, Applicants contend that claims 1-33 presently pending in the application are patentable and in condition for allowance. Accordingly, Applicants request the allowance of the application. We invite the Examiner to call the undersigned at (617) 227-7400 if the Examiner deems there are any remaining issues.

Respectfully submitted,
LAHIVE & COCKFIELD, LLP



John S. Curran, Esq.
Reg. No. 50,445
Attorney for Applicants

28 State Street
Boston, MA 02109
TEL. (617) 227-7400
FAX. (617) 742-4214
Date: September 5, 2002

"VERSION WITH MARKINGS TO SHOW CHANGES MADE"

IN THE CLAIMS

Please amend claim 3 as follows.

3. (Amended) The method of claim 1 further comprising the step of performing the analysis on the model to yield results.